

$$A = \begin{pmatrix} 2 & 3 & 4 \\ 3 & -50 & 25 \\ 4 & 25 & -75 \end{pmatrix}$$

$$C = \frac{3}{\sqrt{3^2 + 4^2}} = \frac{3}{5} \quad S = \frac{4}{\sqrt{3^2 + 4^2}}$$

$$Q_1 A = \begin{pmatrix} 1 & 0 & 0 \\ 0 & \frac{3}{5} & \frac{4}{5} \\ 0 & -\frac{4}{5} & \frac{3}{5} \end{pmatrix} \begin{pmatrix} 2 & 3 & 4 \\ 3 & -50 & 25 \\ 4 & 25 & -75 \end{pmatrix} = \begin{pmatrix} 2 & 3 & 4 \\ 5 & -50 & -45 \\ 0 & -25 & -65 \end{pmatrix}$$

$$Q_1 Q_1^T = \begin{pmatrix} 2 & 3 & 4 \\ 5 & -50 & -45 \\ 0 & -25 & -65 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ 0 & \frac{3}{5} & -\frac{4}{5} \\ 0 & \frac{4}{5} & \frac{3}{5} \end{pmatrix} = \begin{pmatrix} 2 & 5 & 0 \\ 5 & -66 & 73 \\ 0 & -72 & -79 \end{pmatrix}$$